at one time commander at West Point, opened the morning session with an interesting account of the attack on Washington in 1814. He was followed by two of the lecturers in the course recently given at the Lowell institute in Boston, under the auspices of the Military historical society of Massachusetts, — Col. William Allan of Maryland, formerly on 'Stonewall' Jackson's staff; and Major Jedidiah Hotchkiss of Staunton, who served through the war on Jackson's, Lee's, Ewell's, and Early's staffs. Colonel Allan gave an exposition of the confederate and federal strategy in the 'Pope campaign' before Washington in 1862. His remarks were illustrated by two large plans of the scene of those operations, and were listened to with the greatest interest, even by those to whom the subject was not familiar. Major Hotchkiss followed with an illustration of the value of topographical knowledge in battles and campaigns. He drew on the board with colored crayons a map of Virginia to illustrate his remarks. His dexterity was viewed with wonderment by those in the audience who have tried — though unsuccessfully — to accomplish the same results. In the evening the attendance was even larger than at any previous meeting. Mr. Bancroft presided, and was the recipient of an ovation which was as unexpected as it was genuine and merited. Mr. Justin Winsor was elected president for the coming year, with President Adams of Cornell and William F. Poole of Chicago as vice-presidents, while William Wirt Henry of Richmond took Mr. Weeden's place on the council. At this session Dr. J. F. Jameson of the Johns Hopkins read an abstract of a very valuable paper on Usselinx, founder of the Dutch and Swedish West India companies. The venerable president of the Massachusetts historical society, Dr. George E. Ellis, spoke of the necessity of an occasional reconstruction of history. He gave as an example the work now being edited by Mr. Winsor, — 'The narrative and critical history of America.'

Altogether the meeting was a most enjoyable one. The papers were for the most part creditable to the association, and especially to its secretary, to whom the making-up of the programme was in great measure left. The one regrettable feature was the continued absence of papers on other than American history. Why is it that the teachers of other periods do not come forward? Surely there must be good work done in other fields; and the hearty reception accorded Professor Emerton last year showed that the members are interested in what many regard as really more historical subjects than the comparatively recent history of America. The absence of papers on economic subjects, and on matters of present discussion, was marked. Excursions to Arlington, Mount Vernon, and points nearer headquarters, filled up the spare hours, and the experiment of holding meetings in some place other than Saratoga may be regarded as highly successful.

PROPOSED ENGLISH FISHERY BOARD.[1]

I HAVE read with considerable interest Professor Huxley's memorandum on the proposed fishery board, and with much of what he says I agree. It seems to me, however, that attention is likely to be diverted from the real question demanding consideration, by Professor Huxley's attack upon certain persons unknown, who appear to have demanded in some newspaper which Professor Huxley has seen, that men of science should 'manage the fisheries.' That men of science should interfere with commercial speculation, and manage the fisheries in that sense, is a proposition so preposterous, that it is difficult to understand why Professor Huxley should have thought it worthy of notice.

The question which really demands consideration is another one altogether, and is simply this: Is it desirable that men of science should be definitely and permanently employed to manage the inquiries which are necessary in order that a satisfactory basis may be obtained for legislation in regard to a variety of fishery questions? And, further, is it desirable that such persons should be employed by the state in order to ascertain whether certain steps in the way of protection and cultivation of fishes can be usefully carried out by the state for the benefit of the community? Professor Huxley does not, in my judgment, attach sufficient importance to such inquiries, and the necessity for a permanent organization of officials to deal with them, when he says, "Let the department obtain such scientific help as is needful from persons of recognized competency, who are not under the control of the administrative department." This proposal seems to be somewhat inconsistent with another statement in the memorandum, where Professor Huxley says, "I should say that any amount of money bestowed upon the scientific investigation of the effect of some modes of fishing might be well spent." If 'any amount of money' is to be spent, and so large a question as 'the effect of some modes of fishing' is to be investigated scientifically, then it would seem well that the department should have a trained and permanent staff of expert naturalists, and a scientific authority to direct their inquiries.

The fact is, that enough time and money have

[1] From the *Journal of the society of arts*, April 30.

been spent by the state upon spasmodic inquiries into the effects of trawling, and the various questions the rapid investigation of which has from time to time appeared to be 'needful.' What is now needed is a more systematic and determined attempt to grapple with some of the more important questions, the solution of which is likely to affect the interests of the fish industry.

I have drawn up a brief statement on the subject of the relation of scientific investigation to fishery interests, which, in no dogmatic spirit, but with a view to eliciting criticism and suggestion, I here submit to the reader: —

1. The necessity for an administration of our marine and fresh-water fisheries, based upon thorough or scientific knowledge of all that relates to them, has become obvious of late years. The trawling commission of 1884–85 has reported to this effect, in so far as the subject of their inquiries is concerned. Other nations have adopted such a method of dealing with their fisheries, with good results and the promise of better.

2. The inquiries and operations necessary cannot be conducted as the result of private commercial enterprise: they must be national in character.

3. While the general trade returns of the fishing-industry on the one hand, and the practical enforcing of regulations as to the protection of fishing-grounds and the restriction of fishing-operations within certain seasons and localities, are matters with which an ordinary staff of officials can effectually deal, yet the chief purposes of the operation of a satisfactory fisheries department are of such a nature that only expert naturalists can usefully advise upon them and carry them out. It is therefore important that the organization of a state fisheries department should either be primarily under the control of a scientific authority, who should direct the practical agencies as to trade returns and police, or that there should be distinct and parallel branches of the department, — the one concerned in scientific questions, the other in collecting trade returns and in directing the fisheries police.

4. It does not appear that there is any ground for supposing that individuals of scientific training are *ipso facto* unfitted for administrative duties, and there would be obvious advantages in placing the operations of a fisheries department under one head. Indeed, it may be maintained that a scientific education, and capacity for scientific work, are likely to produce a more practical and enterprising director of such a department than could elsewhere be found. It has not been found desirable to place the administration of the botanical institution at Kew in the hands of a non-scientific director, and there is no obvious reason for avoiding the employment of a scientific staff in the case of a fisheries department. It is extremely important, from the point of view of the public welfare, that the state should not set the example of ignoring the value of scientific knowledge and training; while it is no less important to avoid the waste of public money which must result from employing officials who are not conversant with the matters with which they have to deal, in place of trained experts.

The nature of the work to be done, is, 1°, generally to ascertain what restrictions or modifications in the proceedings of fishermen are desirable, so as to insure the largest and most satisfactory returns, prospectively as well as immediately, from the fishing-grounds of the English coast and from English rivers and lakes; 2°, especially to ascertain whether existing fishing-grounds can be improved by the artificial breeding of food-fishes and shell-fish, and to determine the methods of carrying on such breeding, and to put these methods into practice; 3°, to find new fishing-grounds; 4°, to introduce new fish, — either actually new to the locality, or new to the consumer; 5°, to introduce (if practicable) methods of rearing and fattening marine fish in stock-ponds; 6°, to look after the cultivation and supply of bait; 7°, to introduce new baits, new methods of fishing, improved nets, improved boats, new methods of transport and of curing.

The work can be divided into two sections: A. Investigation; B. Practical administration.

A. Investigation. — The inquiries which are necessary in order to effect the purposes indicated above are as follows: —

1. A thorough physical and biological exploration of the British coasts within a certain distance of the shore-line, especially and primarily in the neigborhood of fishing-grounds. The investigation must include a determination of temperature and currents at various depths, the nature of the bottom, the composition of the sea-water, and the influence of rivers and conformation of coast upon these features. At the same time, the entire range of the fauna and flora must be investigated in relation to small areas, so as to connect the varying living inhabitants of different areas with the varying physical conditions of those areas, and with the varying association of the living inhabitants *inter se*. Only in this way can the relation of food-fishes to the physical conditions of the sea and to their living associates be ascertained, and data furnished for ultimately determining the causes of the local distribution of different kinds of food-fishes, and of the periodic migrations of some kinds of them.

2. A thoroughly detailed and accurate knowledge of the food, habits, and movements of each of the important kinds of food-fishes (of which about five and twenty, together with six shell-fish important either as food or bait, may be reckoned). The relation of each of these kinds of fish to its fishing-ground must be separately ascertained; its time and mode of reproduction; the mode of fertilization of its eggs; the growth of the embryo; the food and habits of the fry; the enemies of the young and of the adult; the relation of both young and adult to temperature, to influx of fresh water, to sewage contamination, to disturbing agencies, such as trawling and ordinary traffic.

3. An inquiry as to whether, over a long period of years, there has been an increase or decrease in the abundance of each kind of food-fish on the chief fishing-grounds as a matter of fact, together with an inquiry as to the actual take of each kind of fish in successive years, and, further, an inquiry as to any accompanying variation in (*a*) the number of fishing-boats, (*b*) the methods of fishing, (*c*) the climatic conditions, or other such possibly influential conditions as previous inquiry may have suggested.

4. An inquiry for the purpose of ascertaining experimentally whether the decrease in the yield of fishing-grounds, in regard to several species of food-fish, can be remedied (*a*) by artificial breeding of the fish; (*b*) by protecting the young; (*c*) by increasing its natural food; (*d*) by destruction of its enemies; (*e*) by restrictive legislation as to time or place of fishing, and as to size of fish which may be taken, and character of fishing-apparatus which may be used.

5. An inquiry to ascertain whether, if periodic, natural causes are at work in determining the fluctuations of the yield of fishing-grounds, their effect can be foretold, and whether this effect can in any cases be counteracted; similarly to ascertain, in the case of migratory shoal-fish, whether any simple and trustworthy means can be brought into operation for the purpose of foretelling the places and times of their migrations, so as to enable both fishermen and fish-dealers to be ready for their arrival.

6. An inquiry into the diseases of fish, especially in relation to salmon and other fresh-water fish.

B. Practical administration. — The chief heads under which this presents itself as distinct from the antecedent search for reliable data are —

1. The management of an efficient 'intelligence department,' giving weekly statistics of the fishing-industry, the appearance and disappearance of certain fish at particular spots, the number of fishing-boats employed, the methods of fishing employed, the meteorological conditions.

2. The advising and enforcing of restrictions by the legislature as to time, place, and method of capture of fish.

3. The artificial breeding and rearing of fish to stock-impoverished fishing-grounds.

4. The leasing and management of the foreshore and sea-bottom in particular spots, for the purposes of oyster-culture and mussel-culture, and of marsh-lands near the sea for the formation of tanks and fish-ponds.

5. The opening-up of new fishing-grounds and of new fish-industries (curing and treatment of fish for commercial purposes).

6. The introduction of new species of food-fish and shell-fish.

It is a matter of fundamental importance to determine, first of all, whether it is desirable that these matters should be dealt with by a permanent staff, or, on the other hand, by the occasional employment of a scientific man — not habitually occupied in these inquiries — to attempt the solution of any particular problem which an unskilled official may present to him. Clearly there must be economy in employing permanently certain naturalists who will familiarize themselves with this special class of questions, and become experts in all that relates to fishery problems.

Further, is it desirable that the matters which are to be inquired into should be determined by an official unskilled in natural history? or, on the other hand, that the selection of inquiries likely to lead to a satisfactory result should be made by a man of science, specially conversant with the nature of the things to be dealt with?

The organization required consists, so far as persons are concerned, of, 1°, a chief scientific authority; 2°, a staff of working naturalist-inspectors; 3°, a staff of clerks; and, so far as material is concerned, of, 4°, a London office, with collection of fishes, apparatus used in fishing, maps, survey-records, statistical returns, and library; 5°, a surveying-ship, under the orders of the department, to be manned and maintained by the admiralty; 6°, a chief laboratory fitted for carrying on investigations such as those named above, and also two smaller movable laboratories, together with steam-yacht fitted for dredging and sounding; 7°, hatching-stations and fish-ponds.

With regard to the foregoing headings, it is a matter for consideration whether the 'chief scientific authority' should be an individual, or a committee af five. The position assigned to this post should be equal to that of the director of the geological survey, or the director of the Royal gardens, Kew; or, if the 'authority' takes the

form of a committee, it should be placed on the same footing as the Meteorological council. The person or persons so appointed should be responsible for all the operations of the department, and of such scientific training and capacity as to be likely to devise the most useful lines of inquiry and administration.

The 'naturalist-inspectors' should be six in number, but operations might be commenced with a smaller staff. They should be thoroughly competent observers, and, under the direction of the chief scientific authority, they would be variously employed, either on the surveying-ship, at the chief laboratory, or in local laboratories, hatching-stations, or in the London office and museum.

The naturalists thus employed would become specialists in all matters relating to the life-history of fishes and their food : they would acquire a skill and knowledge far beyond that which it is possible to find among existing naturalists, who occasionally are requested to make hurried reports on such matters as salmon-disease, or the supposed injury of the herring-fisheries by trawlers.

One of the naturalist-inspectors should be a chemist and physicist, in order to report on the composition of the water and the nature of the bottom in the areas investigated.

'Clerks' would be required in the London office to tabulate statistics and carry on correspondence. These gentlemen need not necessarily have any scientific knowledge. It would probably be necessary to have a correspondent or agent of the department in every large fishing-centre. Probably the coast-guard officials might be taken into this service.

With regard to material equipment, it appears to be necessary that a scientific fisheries department should have at its London office a museum of fishing-apparatus for reference and instruction, and also complete collections illustrative of the fishes, their food, enemies, and other surroundings. In the same building would be exhibited maps showing the distribution and migrations of food-fishes, the coast temperature and its variations, the varying character of the sea-bottom, sea-water, etc.

The surveying ship or ships would be provided by the admiralty.

A central laboratory is in course of erection upon Plymouth Sound by the Marine biological association. Her Majesty's government has promised to contribute £5,000, and £500 a year, to this institution, on condition that its resources are available for the purpose here indicated. Certain of the 'naturalist-inspectors' (probably three at any one time) would be stationed at the Plymouth laboratory in order to carry on special studies of the development and food of particular species of fish.

The smaller movable laboratories, steam-yacht, and other appliances would not be costly.

RAY LANKESTER.

NOTES AND NEWS.

WE learn from a letter of Professor Holden's, in the last number (2724–25) of the *Astronomische nachrichten*, just received, that the Lick trustees have decided to purchase from Messrs. Feil & Mantois a 36-inch crown disk, which was made by them at the same time with the crown disk of the objective now in the hands of the Clarks. The Clarks "have received the order to figure this disk as a third (photographic) lens for the large objective."

— The work of the U. S. fish commission shows most gratifying results in the artificial propagation of shad. An unprecedented abundance of these fish is noticed this season in all the rivers which have been supplied with young fish by the commission. This increase is noticed especially in the waters of the Pacific coast, where shad were unknown previous to their introduction by the U. S. fish commission.

— The New York assembly has passed the bill providing for the appropriation of twenty thousand dollars annually to the Metropolitan museum of art and the American museum of natural history, in order that they may be kept open to the public, free of charge, on Sundays. It is expected that it will soon be favorably reported by the senate committee, and become a law.

— The house committee on agriculture has reported favorably the bill to establish agricultural experimental stations in connection with the colleges established in the several states ; also the bill to enlarge the powers and duties of the department of agriculture, making it an executive department.

— The U. S. coast survey has issued the following charts, which are now ready for the public : Topographical sheets of the re-survey of the harbors of New York, Brooklyn, and Jersey City. It is intended to combine these sheets with the hydrographic work already executed, and thus to give an extended and accurate map of all the waters lying around New York City.

— An international maritime exhibition will be held in Havre, May 1 of next year, to be devoted to all kinds of sailing or steam ships, engines, life-saving contrivances, fisheries, and the products of the French colonies. Applications to